

1652
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**TRANSMITTAL
FORM***(to be used for all correspondence after initial filing)*

Application Number

10/563,655

Filing Date

January 5, 2006

First Named Inventor

J. Christopher Anderson

Group Art Unit

1652

Examiner Name

Unassigned

Total Number of Pages in This Submission

Attorney Docket Number

54A-000410US

ENCLOSURES (check all that apply)

- ☐ Fee Transmittal Form
☐ Fee Attached
☐ Amendment / Response
☐ Amendment and Request for Reconsideration
☐ Affidavits/declaration(s)
☐ Extension of Time Request
☒ Receipt Acknowledgement Postcard
☒ Information Disclosure Statement
☐ Certified Copy of Priority Document(s)
☐ Response to Missing Parts/Incomplete Application
☐ Response to Missing Parts under 37 CFR 1.52 or 1.53

- ☒ PTO-1449 Form
☒ Cited References
☐ Copy of PCT Search Report
☐ Copy of EP Search Report
☐ Petition to Convert to a Provisional Application
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Edward J. DesJardins, Ph.D., Reg. No. 51,162, Quine Intellectual Property Law Group, P.C.

Signature

Date

September 11, 2007

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QUINE INTELLECTUAL PROPERTY LAW GROUP, P.C.

By Kimberly Cheung
Kimberly Cheung

Attorney Docket No. 54A-000410US
TSRI-1000.2 US / AMB0098P
Ambrx Ref. No. 0055.00US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

J. Christopher Anderson and Peter G. Schultz

Application No.: 10/563,655

Filed: January 5, 2006

For: COMPOSITIONS OF
ORTHOGONAL LEUCYL-TRNA
AND AMINOACYL-TRNA
SYNTHETASE PAIRS AND USES
THEREOF

Confirmation No. 3991

Examiner: Unassigned

Art Unit: 1652

INFORMATION DISCLOSURE
STATEMENT UNDER 37 CFR § 1.97 and
§ 1.98

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

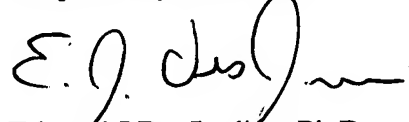
Sir:

The references cited on attached form PTO-1449 are being called to the attention of the Examiner. Copies of the references are enclosed. Copies of the cited US Patent applications and US Publications have not been enclosed because they are no longer required by the office for submission. It is respectfully requested that the cited information be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue therefrom.

As provided for by 37 CFR 1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

Applicant believes that no fee is required for submission of this statement, since it is being submitted prior to the first Office Action on the merits per 37 CFR 1.97(b)(3). However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No. 50-0893. Please deduct any additional fees from, or credit any overpayment to, the above-noted Deposit Account.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "E. J. DesJardins", with a stylized flourish at the end.

Edward J. DesJardins, Ph.D.
Reg. No. 51,162

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Substitute for form 1449A-B/PTO

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known

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Filing Date	January 5, 2006
First Named Inventor	J. Christopher Anderson
Group Art Unit	1652
Examiner Name	Unassigned
Attorney Docket Number	54A-000410US
Date Submitted	September 11, 2007

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, lines, Where Relevant Passages or Relevant Figures Appeal
		Number	Kind Code (if known)			
	1	2005/0009049	A1	Chin et al.	06-13-2005	
	2	6,927,042	B2	Schultz et al.	08-09-2005	
	3	7,045,337	B2	Schultz et al.	05-16-2006	
	4	7,083,970	B2	Schultz et al.	08-01-2006	

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
		Office	Number	Kind Code (if known)				
	5	WO	2002/085923	A2	The Scripps Research Institute	10-31-2002		
	6	WO	2002/086075	A2	The Scripps Research Institute	10-31-2002		
	7	WO	2004/035605	A2	The Scripps Research Institute	04-29-2004		
	8	WO	2004/035743	A2	The Scripps Research Institute	04-29-2004		
	9	WO	2004/094593	A2	The Scripps Research Institute	11-04-2004		
	10	WO	2005/003294	A2	The Scripps Research Institute	01-13-2005		

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T
	11	ANDERSON (August 2003) "Pathway engineering of the expanding genetic code." Thesis presented for the degree of Doctor of Philosophy in Chemistry, The Scripps Research Institute, La Jolla, CA. Call Number QD1000. A63 (2003); UMI Publication No. 3111397.	
	12	ANDERSON AND SCHULTZ (2003) "Adaptation of an Orthogonal Archaeal Leucyl-tRNA and Synthetase Pair for Four-base, Amber, and Opal Suppression." <i>Biochemistry</i> , 42: 9598-9608.	
	13	ANDERSON ET AL. (2002) "Exploring the limits of codon and anticodon size." <i>Chemistry & Biology</i> , 9: 237-244.	

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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14	ANDERSON ET AL. (May 18, 2004) "An expanded genetic code with a functional quadruplet codon." <i>Proceedings of the National Academy of Sciences, USA</i> , 101(20): 7566-7571.	
15	ATKINS ET AL. (1991) "Towards a genetic dissection of the basis of triplet decoding, and its natural subversion: programmed reading frame shifts and hops," <i>Annu. Rev. Genet.</i> 25:201-228.	
16	BOSSI AND ROTH (1981) "Four-base codons ACCA, ACCU and ACCC are recognized by frameshift suppressor sufJ." <i>Cell</i> , 25(2): 489-496.	
17	BUTTCHEER ET AL. (1994) "Modulation of the suppression efficiency and amino acid identity of an artificial yeast amber isoleucine transfer RNA in Escherichia coli by a G-U pair in the anticodon stem," <i>Biochemical and biophysical research communications</i> , 200(1):370-377.	
18	CHEN ET AL. (1994) "Properties of the lysyl-tRNA synthetase gene and product from the extreme thermophile Thermus thermophilus." <i>Journal of Bacteriology</i> , 176(9): 2699-2705.	
19	CHIN ET AL. (2003) "An expanded eukaryotic genetic code." <i>Science</i> . 301: 964-967.	
20	CHIN ET AL. (2002) "Addition of a photocrosslinking amino acid to the genetic code of Escherichia coli," <i>Proc. Natl. Acad. Sci. U. S. A.</i> 99(17):11020-11024	
21	CHIN ET AL. (2002) "Addition of p-azido-L-phenylalanine to the genetic code of Escherichia coli," <i>J. Am. Chem. Soc.</i> 124(31):9026-9027	
22	CLOAD ET AL. (1996) "Development of improved tRNAs for in vitro biosynthesis of proteins containing unnatural amino acids," <i>Chem. Biol.</i> 3(12):1033-1038	
23	CURRAN AND YARUS (1987) "Reading frame selection and transfer RNA anticodon loop stacking." <i>Science</i> , 238: 1545-1550.	
24	EDWARDS AND SCHIMMEL. (1990) "A bacterial amber suppressor in Saccharomyces cerevisiae is selectively recognized by a bacterial aminoacyl-tRNA synthetase," <i>Mol. Cell. Biol.</i> 10(4):1633-1641.	
25	FENG ET AL. (2003) "Expanding tRNA recognition of a tRNA synthetase by a single amino acid change." <i>Proceedings of the National Academy of Sciences USA</i> , 100(10): 5676-5681.	
26	FORSTER ET AL. (2003) "Programming peptidomimetic synthetases by translating genetic codes designed de novo." <i>Proceedings of the National Academy of Sciences USA</i> , 100(11): 6353-6357.	
27	FREIST AND GAUSS (1995) "Lysyl-tRNA synthetase," <i>Biological Chemistry Hoppe-Seyler</i> , 376(8):451-472.	
28	FURDON ET AL. (1983) "A G43 to U43 mutation in E. coli tRNA ^{tyr} su3+ which affects processing by RNase P," <i>Nucleic Acids Res.</i> 11(5):1491-1505.	

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29	HIRAO ET AL. (2002) "An unnatural base pair for incorporating amino acid analogues into protein," <i>Nature Biotechnology</i> , 20:177-182.	
30	HOHSAKA AND SISIDO (2002) "Incorporation of non-natural amino acids into proteins." <i>Current Opinion in Chemical Biology</i> , 6: 809-815.	
31	HOHSAKA ET AL. (2001) "Five-base codons for incorporation of nonnatural amino acids into proteins." <i>Nucleic Acids Research</i> , 29(17): 3646-3651.	
32	HOHSAKA ET AL. (1999) "Incorporation of Two Different Nonnatural Amino Acids Independently into a Single Protein through Extension of the Genetic Code," <i>J. Am. Chem. Soc.</i> , 121(51):12194-12195.	
33	HOHSAKA ET AL. (1999) "Efficient Incorporation of Nonnatural Amino Acids with Large Aromatic Groups into Streptavidin in In Vitro Protein Synthesizing Systems," <i>J. Am. Chem. Soc.</i> , 121(1):34-40.	
34	HOU ET AL. (1992) "Novel transfer RNAs that are active in Escherichia coli." <i>Biochemistry</i> , 31(17): 4157-4160.	
35	KLEINA (1990) "Construction of Escherichia coli amber suppressor tRNA genes. II. Synthesis of additional tRNA genes and improvement of suppressor efficiency," <i>J. Mol. Biol.</i> , 213(4):705-717.	
36	KOBAYAYASHI ET AL. (2003) "Structural basis for orthogonal tRNA specific of tyrosyl-tRNA synthetases for genetic code expansion." <i>Nature Structural Biology</i> , 10(6): 425-432.	
37	KOWAL AND OLIVER (1997) "Exploiting unassigned codons in Micrococcus luteus for tRNA-based amino acid mutagenesis," <i>Nucl. Acid. Res.</i> , 25(22):4685 -4689.	
38	KOWAL ET AL. (2001) "Twenty-first aminoacyl-tRNA synthetase-suppressor tRNA pairs for possible use in site-specific incorporation of amino acid analogues into proteins in eukaryotes and in eubacteria," <i>Proc. Natl. Acad. Sci. U. S. A.</i> , 98(5):2268-2273.	
39	KWOK AND WONG (1980) "Evolutionary relationship between Halobacterium cutirubrum and eukaryotes determined by use of aminoacyl-tRNA synthetases as phylogenetic probes," <i>Can. J. Biochem.</i> 58(3):213-218.	
40	LIU AND SCHULTZ (1999) "Progress toward the evolution of an organism with an expanded genetic code." <i>Proceedings of the National Academy of Sciences USA</i> , 96: 4780-4785.	
41	MA ET AL. (1993) "In vitro protein engineering using synthetic tRNA(Ala) with different anticodons" <i>Biochemistry</i> , 32(31):7939-7945.	
42	MAGLIERY ET AL. (2001) "Expanding the genetic code: selection of efficient suppressors of four-base codons and identification of "shifty" four-base codons with a library approach in Escherichia coli." <i>Journal of Molecular Biology</i> , 307: 755-769.	
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43	MARTINIS AND SCHIMMEL (1995) in <i>tRNA: Structure, Biosynthesis, and Function</i> , Eds. Soll, D. & RajBhandary, U. L. (Am. Soc. Microbiol., Washington, DC), pp. 349-370.	
44	MCCLAIN ET AL. (1988) "Association of transfer RNA acceptor identity with a helical irregularity, <i>Science</i> , 242(4886):1681-1684.	
45	MOORE ET AL. (2000) "Quadruplet codons: implications for code expansion and the specification of translation step size," <i>J. Mol. Biol.</i> , 298(2):195-209.	
46	O'CONNOR (2002) "Insertions in the anticodon loop of tRNA(1)(Gln)(sufG) and tRNA(Lys) promote quadruplet decoding of CAAA." <i>Nucleic Acids Research</i> , 30(9): 1985-1990.	
47	OHNO ET AL. (1998) "Co-Expression of Yeast Amber Suppressor tRNA ^{tyr} and Synthetase in Escherichia coli: Possibility to Expand the Genetic Code." <i>J. Biochem</i> 124(6):1065-1068.	
48	PASTRNAK ET AL. (2000) "A New Orthogonal Suppressor tRNA/Aminoacyl-tRNA Synthetase Pair for Evolving an Organism with an Expanded Genetic Code," <i>Helv. Chim. Acta</i> 83:2277-2286.	
49	PICCIRILLI ET AL. (1990) "Enzymatic incorporation of a new base pair into DNA and RNA extends the genetic alphabet," <i>Nature</i> , 343(6253):33-37.	
50	RAFTERY AND YARUS (1987) "Systematic alterations in the anticodon arm make tRNA(Glu)-Suoc a more efficient suppressor," <i>EMBO J.</i> 6(5):1499-1506.	
51	SAKAMOTO ET AL. (2002) "Site-specific incorporation of an unnatural amino acid into proteins in mammalian cells," <i>Nucleic Acids Res.</i> 30(21):4692-4699.	
52	SAMPSON AND SAKS (1993) "Contributions of discrete tRNA ^{Ser} domains to aminoacylation by <i>E.coli</i> seryl-tRNA synthetase: a kinetic analysis using model RNA substrates," <i>Nucleic Acids Res.</i> , 21(19):4467-4475.	
53	SANTORO ET AL. (2002) "An efficient system for the evolution of aminoacyl-tRNA synthetase specificity." <i>Nature Biotechnology</i> , 20:1044-1048.	
54	SANTORO ET AL. (2003) "An archaeobacteria-derived glutamyl-tRNA synthetase and tRNA pair for unnatural amino acid mutagenesis of proteins in Escherichia coli." <i>Nucleic Acids Research</i> , 31(23): 6700-6709.	
55	SHIMIZU ET AL. (1992) "The role of anticodon bases and the discriminator nucleotide in the recognition of some <i>E. coli</i> tRNAs by their aminoacyl-tRNA synthetases," <i>J. Mol. Evol.</i> 35(5): 436-443.	
56	SMITH ET AL. (1987) "The bases of the tRNA anticodon loop are independent by genetic criteria," <i>Nucleic Acids Res.</i> , 15(11):4669-4686.	

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57	SODERBERG AND POULTER (2000) "Escherichia coli dimethylallyl diphosphate:tRNA dimethylallyltransferase: essential elements for recognition of tRNA substrates within the anticodon stem-loop," <i>Biochemistry</i> , 39(21):6546-6553.	
58	SUSSMAN AND KIM (1976) "Three-dimensional structure of a transfer rna in two crystal forms," <i>Science</i> , 192(4242):853-858.	
59	TUOHY ET AL. (1992) "Seven, eight and nine-membered anticodon loop mutants of tRNA(2Arg) which cause +1 frameshifting. Tolerance of DHU arm and other secondary mutations," <i>J. Mol. Biol.</i> , 228(4):1042-1054.	
60	WANG AND SCHULTZ (2001) "A general approach for the generation of orthogonal tRNAs." <i>Chemistry and Biology</i> , 8: 883-890.	
61	WANG ET AL. (2000) "A New Functional Suppressor tRNA/Aminoacyl-tRNA Synthetase Pair for the in Vivo Incorporation of Unnatural Amino Acids into Proteins." <i>Journal of the American Chemistry Society</i> , 122: 5010-5011.	
62	WANG ET AL. (2001) "Expanding the Genetic Code of Escherichia coli." <i>Science</i> , 292: 498-500.	
63	WANG ET AL. (2003) "Addition of the Keto Functional Group to the Genetic Code of Escherichia coli," <i>PNAS</i> , 100(1):56-61.	
64	WU ET AL. (2002) "Enzymatic phosphorylation of unnatural nucleosides," <i>J. Am. Chem. Soc.</i> , 124(49):14626-14630.	
65	YARUS (1982) "Translational efficiency of transfer RNA's: uses of an extended anticodon," <i>Science</i> , 218(4573):646-652.	
66	YARUS ET AL. (1986) "Actions of the anticodon arm in translation on the phenotypes of RNA mutants." <i>Journal of Molecular Biology</i> , 192(2): 235-255.	

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